

THE IDENTITY AND HISTORY OF *MYRICA*  
*CAROLINIENSIS* (MYRICACEAE)

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ABSTRACT. The protologue of *Myrica caroliniensis* is more than adequate to identify it as depicting the bayberry ranging at least from southern New Jersey to Florida and westward into eastern Texas. That species has been mostly known for the past half century as *M. heterophylla*. The alleged differences between the commonly recognized and more northern populations known most recently as *M. pensylvanica* (presumably ranging from Newfoundland at least into northeastern North Carolina) are that the southern elements have more persistent to even evergreen leaves and lack the minute trichomes on both the hardened fruit wall and the young glandular projections or papillae that completely cover the young to just maturing fruit of the northern representatives. The pubescence on the fruit cannot be readily detected on mature fruit due to its heavy deposit of wax. The alleged differences, which seem to be more like tendencies than sharply delineated differences, are not of specific significance any more than those suggested between the northern and southern populations of *Magnolia virginiana*. The name for the bayberry that ranges from Newfoundland south into Florida and westward into eastern Texas should therefore be *Myrica caroliniensis*, the binomial by which it was known throughout most of the nineteenth century. It has been rather conclusively demonstrated that the waxy fruited, papillate species ought to be placed in the genus *Morella*, clearly separate from the genus *Myrica* with the latter's smooth, non-papillate, non-waxy nutlet.

Key Words: *Myrica caroliniensis*, *M. cerifera*, *M. heterophylla*, *M. pensylvanica*, Myricaceae, *Morella caroliniensis*, *Morella cerifera*

Phillip Miller (1768) published the binomial *Myrica caroliniensis* with the following protologue:

3. *Myrica* (*caroliniensis*) foliis lanceolatis serratis, caule suffruticosa. *Myrica* with spear-shaped sawed leaves, and a shrubby stalk. *Myrtus* Brabanticae similis caroliniensis humilior; foliis latioribus & magis serratis. Catesb. Car. vol. 1. p. 13. Lower Carolina Myrtle, or Candleberry-tree resembling that of Brabant, having broader leaves which are more sawed.

The third sort grows naturally in Carolina; this doth not rise



so high as the former, the branches are not so strong, and they have a grayish bark; the leaves are shorter, broader, and are sawed on their edges, but in other respects is like the second sort [*M. cerifera* L.]; the berries of this are also collected for the same purpose [i.e., for a “sort of green wax from the berries, which they make into candles.”]

The above scanty account does not describe unequivocally any one species but it does contrast *Myrica caroliniensis* in a manner adequate to distinguish it from *M. cerifera* for those familiar with the plants in the field. Miller cited Catesby’s account (1730, 1: 13, t. 13.), which was accompanied by a convincing illustration. Catesby is quoted in full below:

“Myrtus Brabanticae similis Caroliniensis humilior; foliis latioribus et magis serratis.

The broad leaved Candle-berry Myrtle.

This grows usually not above 3 feet high; in which, and its having a broader leaf than the tall Candleberry Myrtle, it principally differs from it.”

Linnaeus (1753, 2: 1024) described *Myrica cerifera* [var.]  $\beta$ , based solely upon the same Catesby polynomial and illustration (cited as “Catesb. car. 1: p. 13, t. 13”) noting its presence in “Carolina, Virginia, Pennsylvania.”

Anyone familiar with both *Myrica cerifera* and *M. caroliniensis* in the field in the Carolinas would readily assign the above descriptions of Miller and Catesby to the bayberry (*M. caroliniensis*) with its broader leaves and shorter stature and not to the more commonly encountered wax myrtle, *M. cerifera*.

As is to be expected when a protologue is so lacking in details as is that of *Myrica caroliniensis*, there has been much disagreement for almost two and a half centuries as to the identity of the binomial, especially by those with little or no familiarity with both species in the field. At various times the binomial has been attributed to what has been passing as *M. cerifera*, *M. pensylvanica* Mirb., and *M. heterophylla* Raf. or *M. curtissii* A. Chev. Not surprisingly, our knowledge of the morphological distinctions between these species, as well as their distributional ranges, has greatly increased with the passage of time. Hence we are now better able to determine what the various authors were describing.



Although apparently there is no extant original material of Phillip Miller's *M. caroliniensis*, it seems that the protologue's emphasis on the low stature and the shorter and broader leaves would strongly suggest that a bayberry was being described, and not the wax myrtle (*M. cerifera*). This view is strengthened especially when one considers that *M. cerifera sensu stricto* was already included in a reasonably definitive manner elsewhere in each of the respective publications of Catesby, Linnaeus, and Miller.

Most recent authorities, at least since Fernald (1938), have recognized two bayberries in eastern North America, collectively ranging from southern Newfoundland south into northern Florida and westward into Arkansas and Texas. *Myrica pensylvanica* reportedly is found southward as far as northeastern North Carolina while what has been most recently called *M. heterophylla* reportedly ranges northward from Florida along the coastal plain at least as far as southern New Jersey and perhaps southeastern Pennsylvania as well as westward into Texas. Approximately half the plants are staminate and everyone agrees that staminate plants are exceedingly difficult, if not impossible, for one to distinguish between the two supposed eastern species of bayberry. Bornstein (1997, p. 434) reports that *M. pensylvanica* hybridizes quite readily with both *M. cerifera* and *M. heterophylla* which, if proven to be true, would surely make for an even more bafflingly complex problem in identification. My field experience with these two species in the southeast is considerable and I have not noted evidence of hybridization.

I am unconvinced that there are two species of bayberry in eastern North America. Nothing suggests to me rampant hybridization between the wax myrtles and the bayberries. I cannot recall ever encountering a plant in field or herbarium that could not be identified immediately to species in the southeast. Miller, in publishing *Myrica caroliniensis* failed to distinguish it sharply from even the sympatric *M. cerifera*, not to mention the supposedly largely allopatric *M. pensylvanica*. Only those familiar with the pronounced tendencies exhibited by the plants in the field could expect to recognize the distinction between the species. If there is one bayberry in eastern North America, as my examination of thousands of specimens has convinced me, we can safely conclude that it is *M. caroliniensis* which, besides being the first of the bayberries to be described, is the only bayberry known from South Carolina, the area of Catesby's intensive observations



while preparing his *Natural History of the Carolinas, Florida and the Bahama Islands* (1730–1747). In this case, *M. pensylvanica*, *M. heterophylla*, and *M. curtissii* are all later synonyms of Miller's *M. caroliniensis*. If, contrary to my conclusion, after examining over two thousand specimens from throughout their collective range, there actually are two species of bayberry in eastern North America, the southernmost of them is *M. caroliniensis* (Miller 1768) with *M. heterophylla* (Rafinesque 1838) and *M. curtissii* (Chevalier 1901) as later synonyms, the northern bayberry would then be *M. pensylvanica* (Mirbel 1804).

The principal distinction previously employed to separate *Myrica pensylvanica* from *M. heterophylla* has been the presence of rather abundant but short, stiff trichomes on the densely compacted glandular papillae covering the usually pubescent, hardened wall of the fruit prior to the deposition of the heavy waxy layer. Only a minority of the thousands of specimens examined were of the gender and stage in which this feature could be employed. I have found specimens whose papillae were hirsutulous among collections from the Gulf Coast and the frequency of such puberulently fruited specimens was even much higher in eastern North Carolina than further south. In my experience, species are separable by more and stronger characters than those differentiating these alleged species (i.e., *M. caroliniensis* and *M. pensylvanica*). Leaves of *M. caroliniensis sensu lato* are retained throughout most of the winter in the more southern parts of its extensive range; plants from the more northern portion of the range of *M. caroliniensis sensu stricto* retain their leaves for a shorter period of time. The reverse is true for those plants previously called *M. pensylvanica*, which lose their leaves rather promptly at the approach of winter in the more northern part of the species' collective range. The only other distinctions claimed to differentiate the two generally accepted species is the color of the young twigs, but I have found color to be so highly variable as to be of no help in distinguishing the alleged northern and southern taxa. My understanding is that we are dealing with one not particularly variable species. Those who persist in cleaving the bayberries into two species should at least accept the fact that *M. caroliniensis* has priority over either *M. heterophylla* or *M. curtissii* and that Philip Miller's name applies to the southern representatives of this somewhat variable, widespread species.

Below are keys extracted from two leading treatments (Born-



stein 1997; Fernald 1950) purportedly distinguishing the two eastern North American bayberries from one another. In a majority of cases these keys do not separate the taxa, since much fewer than half the specimens bear fruit in a state in which the keys can be applied. Since the vegetative features of the twigs are even less applicable due to the great variability of twig color seemingly dependent upon exposure to light and other environmental variables, I question whether we would be able to distinguish staminate plants, or pistillate plants, in most stages of their annual growth unless we first knew their provenance. An unpublished Master's thesis from the University of Georgia (Houghton 1988) analyzed the morphological characteristics as well as the flavonoid profiles of the eastern North American bayberries and wax myrtles concluding that the two bayberries (i.e., *Myrica caroliniensis* and *M. pensylvanica*) were only varietally differentiated. To date the suggested varietal combinations have not been validly published.

Fernald (1950, p. 524) differentiated the two eastern bayberries in his key as shown below:

Bark of mature branches whitish-gray or drab; leaves dull above, membranaceous, deciduous (subpersistent south); inflorescences all borne below the leafy tips; young fruit densely pubescent, ripe fruit 3.5–4.5 mm in diameter .....  
 ..... *Myrica pensylvanica*  
 Bark of mature branches blackish; leaves lustrous above; coriaceous, evergreen; inflorescences below or in the axils of the old leaves; young fruit glabrous, ripe fruit 3–3.5 mm in diameter ..... *Myrica heterophylla*

Bornstein (1997, 3: 431) distinguished the eastern bayberries in his key as follows:

Fruit wall and warty protuberances densely hirsute when young; branches whitish gray in age; leaves deciduous, membranous; fruits 3.5–5.5 mm ..... *Myrica pensylvanica*  
 Fruit wall glabrous or sparsely glandular, warty protuberances ± glandular; branches black; leaves persistent or tardily deciduous, leathery; fruits 3–4.5 mm ..... *Myrica heterophylla*



Type material or original specimens of Philip Miller vouchering his *Myrica caroliniensis* has not been found although diligently sought by several investigators. Rendle (1903) first reported his failure to find original material of Catesby's two myricas depicted on his Plates 13 and 69. Reveal (in litt.) has also searched without success for original material of Miller vouchering his publication of *M. caroliniensis*. Catesby's Plate 69 clearly represents *M. cerifera* and Plate 13 depicts a bayberry. Although specimens of Catesby vouchering his "Myrtus Brabanticae similis Caroliniensis humilior" have not been located, this has not prevented three recent publications from confidently identifying to species, the rather crude drawing and meager description provided by Catesby. Ewan (1974) and Howard and Staples (1983) identified it as the more northern *M. pennsylvanica*, while Wilbur (1990) concluded that it was *M. heterophylla*, a determination clearly based more on the largely allopatric distribution of the two alleged species than upon the detail presented in the drawing and description provided by Catesby. Although previously Catesby had lived and observed nature for several years in southeastern Virginia, he was not then focused on the goal of producing a sumptuously illustrated Natural History. A later extended trip by Catesby was mostly spent in South Carolina and the Bahamas as well as allegedly in Florida, a claim questioned by Reveal (in litt.), for the intensive observation and painting that preceded his long-protracted presentation of *The Natural History of the Carolinas, Florida and the Bahama Islands*.

Fernald (1935, p. 423) made a major effort to straighten out the nomenclature of the eastern wax myrtles and bayberries of eastern North America without complete success. Fernald stated that "the wrong interpretation of *Myrica caroliniensis* is clearly discussed by Chevalier who correctly takes up for the deciduous-leaved and northern species the name of *M. pennsylvanica* Loiseleur." [Later, Fernald (1938, p. 410), upon the urgings of Rehder, adopted the spelling *pennsylvanica* since Loiseleur (actually the author/editor was Mirbel 1804) employed both spellings and Chevalier (1901) had adopted the more usual form.] Chevalier's clarification of *M. caroliniensis*, which earned Fernald's approval, was that Chevalier refused to take up the earlier *M. caroliniensis* since that binomial had been frequently applied to a more southern species which Chevalier described on the next page as "*M. curtissi*," another name for the more southern bayberry. If Che-



valier ever explained why he felt that those who employed *M. caroliniensis* as the binomial for the southern bayberry were mistaken, I have not found it. It is true that *M. caroliniensis*, as stated on p. 184 of Chevalier's monograph, had been used by many early authors for the entire complex, ranging from Newfoundland south along the coastal plain into Florida and west along the Gulf Coast into Texas and then north into Arkansas, but that sort of confusion was routinely resolved by Fernald and most other authors without abandoning such names. If that were reason enough to routinely drop a name, chaos would reign, as Fernald frequently noted (e.g., 1946, p. 389).

Fernald (1935, p. 423) added to the nomenclatural confusion by unequivocally stating without explanation or stated evidence that *Myrica cerifera* included *M. caroliniensis*, and this was accepted by Rehder (1949, p. 87b), also without discussion. It should not surprise anyone that, after such a thorough muddling, the binomial *M. caroliniensis* dropped from botanical usage. In spite of such flagrant abuse, I do not think the binomial irretrievably lost. Examination of the protologue of *M. caroliniensis*, as presented on the first page of this note, in my opinion confirms that those who employed that binomial for the southern bayberry were correct. *Myrica caroliniensis* (Miller 1768), *M. pennsylvanica* (Mirbel 1804), *M. heterophylla* (Rafinesque 1838), and *M. curtissii* (Chevalier 1901) are all, in my opinion, synonyms of the eastern bayberry. Those who recognize two species within the eastern bayberries would agree, I believe, that only *M. pennsylvanica* ought not be included in that listing.

Fernald (1935, p. 423), usually so precise in his bibliographic sleuthing, uncharacteristically misled us in equating *Myrica caroliniensis* with *M. cerifera* and also then followed Chevalier in recognizing the southern bayberry as *M. curtissii*. Three years later, Fernald (1938, p. 409–410) took up the earlier *M. heterophylla* for *M. curtissii*, the bayberry with the more southern range (“?Delaware south into Florida and westward into Arkansas and Texas”). Rehder (1949, p. 87), in my opinion mistakenly, followed Fernald (1935) in placing *M. caroliniensis* unquestioningly in the synonymy of *M. cerifera*. Thereafter, Miller's binomial almost completely disappeared from the botanical literature for the next fifty years, except in synonymy.

Fernald (1950, p. 524), in *Gray's Manual of Botany*, summarized his overall unsurpassed knowledge of the flora of north-



eastern North America by recognizing five taxa of *Myrica* subg. *Morella* in the *Gray's Manual* area: *M. cerifera*, *M. pusilla* Raf., *M. pensylvanica*, and *M. heterophylla* with its supposed var. *curtissii* (A. Chev.) Fernald.

Gleason (1952, 2: 24) recognized only one species of bayberry, which he called *Myrica pensylvanica*, while placing the earlier *M. caroliniensis* as employed by Robinson and Fernald (1908), Britton and Brown (1913), and Small (1933) in its synonymy. *Myrica heterophylla* was appended to the account of *M. pensylvanica* somewhat uncertainly but perhaps as a hybrid. The treatment of the northeastern bayberry species was unchanged in Gleason and Cronquist (1963, p. 241) but Cronquist in the second edition (Gleason and Cronquist 1991, pp. 80–81) accepted both *M. pensylvanica* and *M. heterophylla* and modified the synonymy of *M. pensylvanica* by including “*Cerothamnus caroliniensis* of authors, perhaps not of Miller.” It should be noted that Miller’s species was not included in the synonymy of *M. heterophylla* where it most certainly belonged. As a synonym of either *M. pensylvanica* or *M. heterophylla*, *M. caroliniensis* would take precedence due to priority.

For simplicity’s sake the case presented here was not further complicated by earlier discussing the species in the genus *Morella* Lour. to which all waxy-fruited binomials mentioned belong (Baird 1968; Killick et al. 1998; Wilbur 1994). All are agreed that that *Myrica sensu lato* is divisible into three major taxa: *Myrica* L. (fruit water-dispersed), *Morella* (fruit bird-dispersed), and *Comptonia* L’Her. ex Aiton (fruit a nut, possibly small mammal-dispersed). That these are meaningful, natural groups seems to be universally accepted even if some still consider them better treated at either sectional or subgeneric ranks. Nearly every investigator in the past eight decades has recognized at least two genera: *Myrica* and *Comptonia*, while in recent decades three genera have been increasingly accepted in North America (e.g., Baird 1968; Chevalier 1901; Kartesz and Meacham 1999; Radford et al. 1968; Wilbur 1994).

The synonymy of the two species accepted here is restricted to the names applied to the eastern North American representatives (i.e., only the eastern United States and Canada). Fortunately the spelling of the binomial “*Myrica curtissii*” below is not of pressing importance since the name is a synonym with little likelihood that it will ever achieve an active role. The specific epithet was



originally published by Chevalier as “*curtissi*,” who always employed that form in his published work. It often appears as “*curtissii*,” the correction resting no doubt upon the authority of Article 60.11. Botanists of the earlier part of the previous century, who knew more Latin than most of us, were far more tolerant of the single *i*, actually feeling that in many cases it was superior. In the text I have employed the double *ii* but have used the single *i* when that was the form there published.

*Morella caroliniensis* (Mill.) Small, Fl. S. E. U.S. 337 & 1329. 1903. [as *Carolinensis*]

*Myrica caroliniensis* Mill., Gard. Dict., ed. 8. no. 3. 1768. [LECTOTYPE: Catesby's Plate 13 in Volume 1. 1730. First designated here, as suggested by J. L. Reveal (in litt.).]

*Myrica cerifera*  $\beta$  *latifolia* Aiton, Hortus Kew. 3: 396. 1789. [ $\beta$  = var.]

*Myrica cerifera*  $\beta$  *frutescens* Castigl., Viagg. Stati Uniti 2: 302. 1790. [Castiglioni cited both Catesby 1: tab. 13 and *Myrica caroliniensis* Mill. but described in most detail plants from Falmouth in eastern Massachusetts.]

*Myrica cerifera*  $\beta$  *media* Michx., Fl. Bor.-Amer. (Michaux) 2: 228. 1803.

*Myrica pensylvanica* Mirb. in Duhamel, Traité Arbr. Arbust. 2: 190. 1804.

*Myrica heterophylla* Raf. in Raf., Alsogr. Amer. 9. 1838. [as *heterophylla*]

*Myrica sessilifolia* Raf., Alsogr. Amer. 10. 1838.

*Myrica sessilifolia* var. *latifolia* Raf., Alsogr. Amer. 10. 1838.

*Myrica Curtissii* A. Chev., Mém. Soc. Sci. Nat. & Math. Cherbourg 32: 269. (Monogr. Myric. 185.) 1901. [as *Curtissi*]

*Myrica Curtissii* var. *media* (Michx.) A. Chev., Mém Soc. Sci. Nat. & Math. Cherbourg 32: 270. (Monogr. Myric. 186.) 1901. [as *Curtissi*]

*Myrica heterophylla* var. *Curtissii* (A. Chev.) Fernald, Rhodora 40: 410. 1938. [as *Curtissi*]

*Cerothamnus caroliniensis* (Mill.) Tidestr., Elys. Marian., Ferns 3: 41. 1910.

*Cerothamnus pensylvanicus* (Mirb.) Moldenke, Revista Sudamer. Bot. 4: 16. 1937.

*Cerothamnus heterophyllus* (Raf.) Moldenke, Phytologia 29: 386. 1975.

*Morella cerifera* (L.) Small, Fl. S. E. U.S. 337 & 1329. 1903.

*Myrica cerifera* L., Sp. Pl. 1024. 1753.

*Myrica cerifera* var. *angustifolia* Aiton, Hortus Kew. 3: 396. 1789.

*Myrica cerifera*  $\beta$  *arborescens* Castigl., Viagg. Stati Uniti 2: 302. 1790.

*Myrica cerifera* [var.] *pumila* Michx., Fl. Bor.-Amer. 2: 228. 1803.

*Myrica pusilla* Raf., Alsogr. Amer. 10. 1838.

*Cerophora lanceolata* Raf., Alsog. Amer. 11. 1838.

*Myrica cerifera*  $\beta$  *angustifolia* C. DC., Prodr. (DC.) 16(2.1): 149. 1864.



Nom. illeg. (Art. 53.1), non Aiton. TYPE: Louisiana, prope New Orleans, *Drummond s.n.* (κ, not seen).

*Myrica pumila* (Michx.) Small, Bull. Torrey Bot. Club 23: 126. 1896.

*Myrica cerifera* var. *dubia* A. Chev., Mém. Soc. Sci. Nat. & Math. Cherbourg 32: 265. (Monogr. Myric. 181.) 1901.

*Morella pumila* (Michx.) Small, Fl. S. E. U.S. 337 & 1329. 1903.

*Cerothamnus arborescens* (Castigl.) Tidestr., Elys. Marian., Ferns 3: 41. 1910.

*Cerothamnus ceriferus* (L.) Small, Fl. Miami 61 & 200. (26 Apr) 1913.

*Cerothamnus pumilus* (Michx.) Small, Shrubs Florida 8 & 133. (4 Sep) 1913.

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